http://www.govinfosecurity.com/topten2010/

A Defensive Cyber Security Battle Plan

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US Department of State
December 15, 2009

Will Address

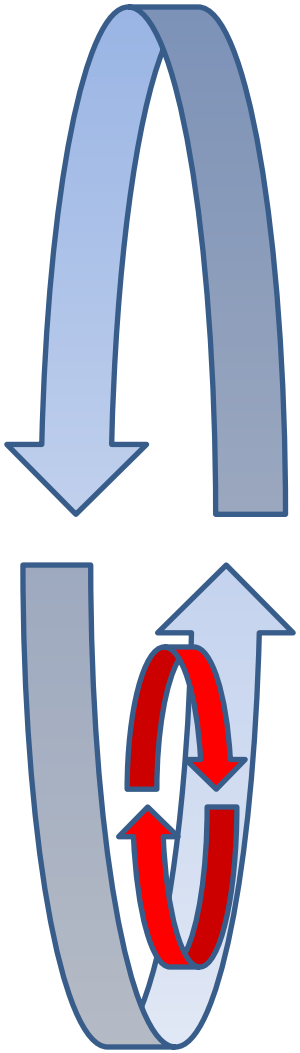
A tactical risk

Paradigm shifts to look at

Lowering cost/raising ROI

Solutions increasing readiness

Deploying assets to win



Tactical Problem

- In combat whoever "Observes – Orients – Decides – Acts"[1] fastest wins.
- Cyber attacks are evolving faster than they can be counteracted outside DoD

1 'OODA' loops described in Boyd , The Fighter Pilot Who Changed the Art of War, by Robert Coram

ATTACKS

Increasing & Shifting

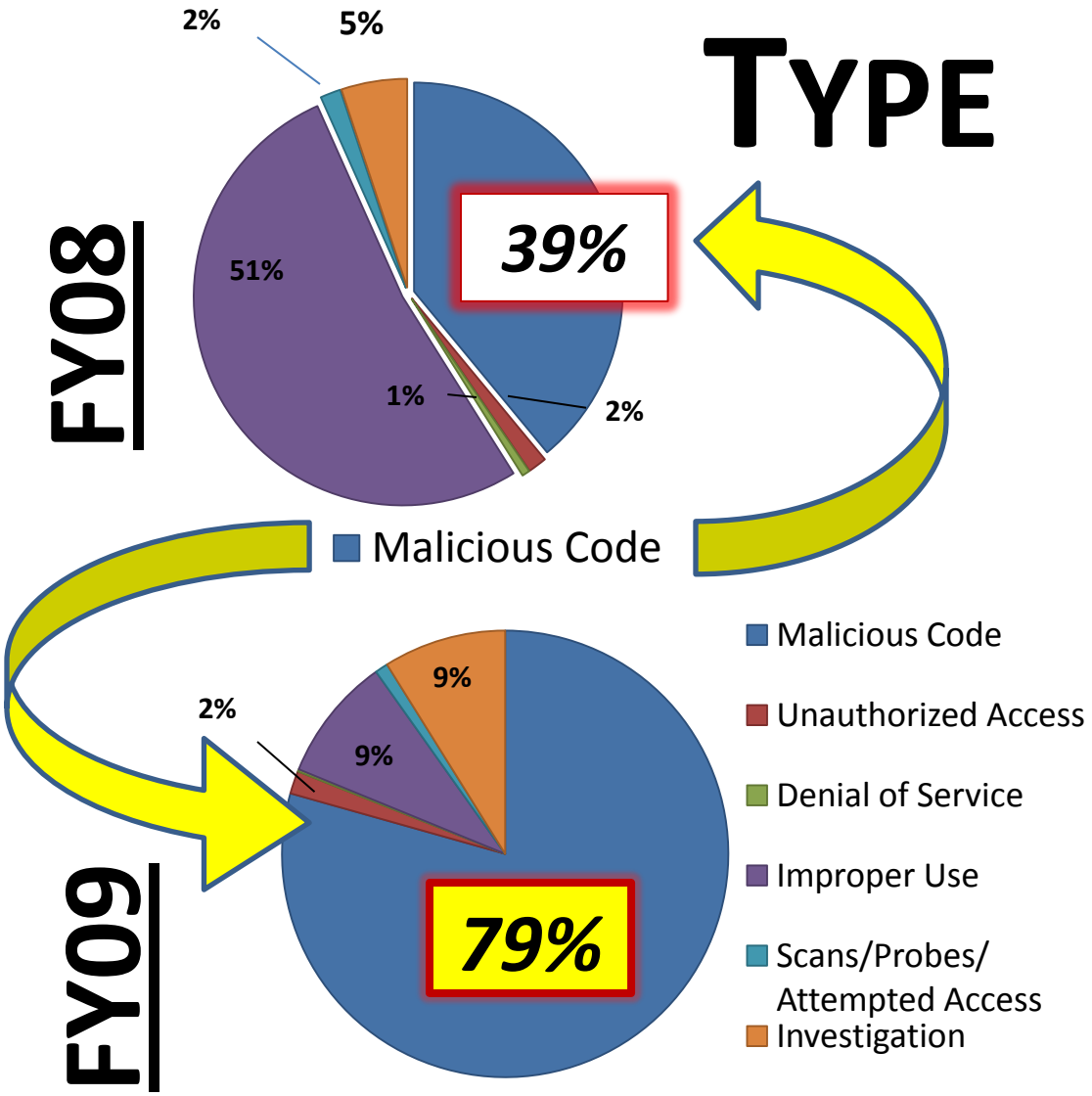
Tickets

Years Compared	
FY 08	*FY 09*
2104	3085

FY 09 Quarters	
Quarters	*Tickets*
Oct-Dec 08	560
Jan-Mar 09	555
Apr-Jun 09	639
July-Aug 09 *(Partial)*	805

Months Compared		
	2008 - Tickets	*2009- Tickets*
June	**154**	**300**
July	**183**	**352**
August	**250**	**453**

Type



Targets:

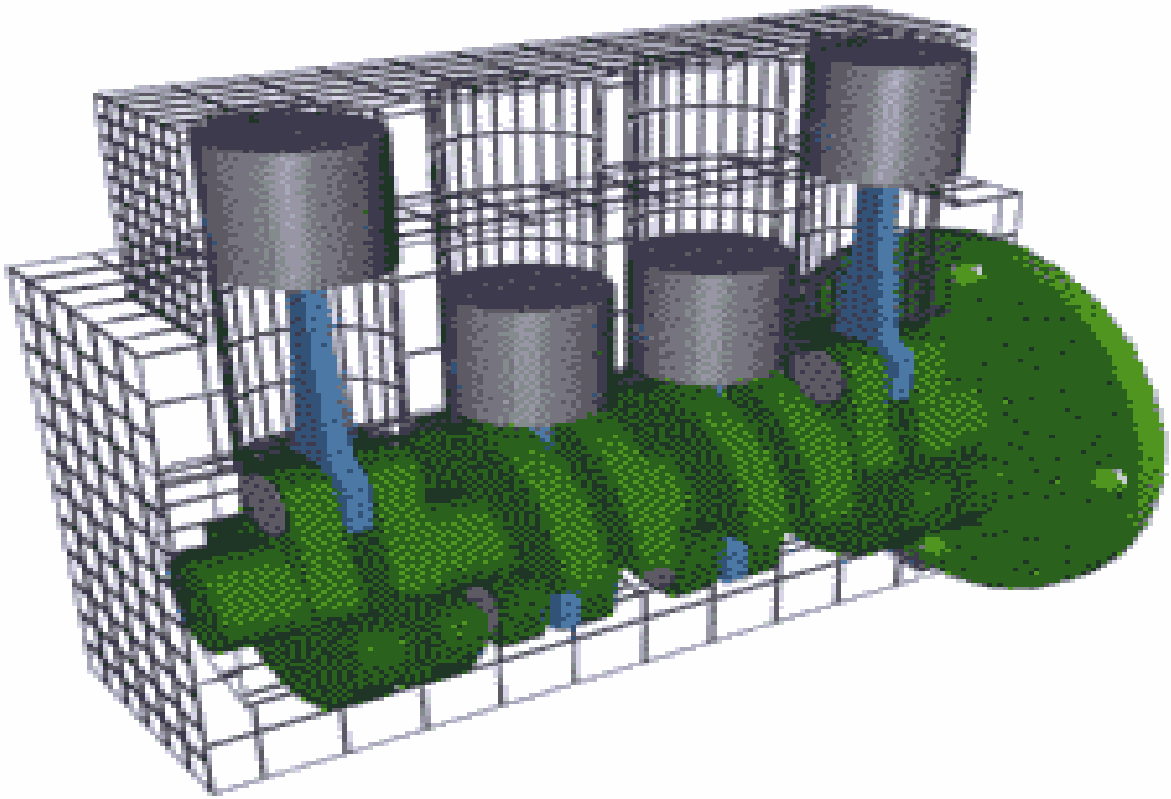
[11 months before Feb 09]

CAG ID	Consensus Audit Guideline	NIST-800-53	US CERT Report
1	Inventory of authorized and unauthorized hardware	CM-1, CM-2, CM-3, CM-4, CM-5, CM-8, CM-9	+ 6 %
2	Inventory of authorized and unauthorized software	CM-1, CM-2, CM-3, CM-5, CM-7, CM-8, CM-9, SA-7	+ 22 %
5	Boundary Defense	AC-17, RA-5, SC-7, SI-4	+ 7 %
9	Controlled access based on need to know	AC-1, AC-2, AC-3, AC-6, AC-13	1 %
12	Anti-malware defenses	AC-3, AC-4, AC-6, AC-17, AC-19, AC-20, AT-2, AT-3, CM-5, MA-3, MA-4, MA-5, MP-2, MP-4, PE-3, PE-4, PL-4, PS-6, RA-5, SA-7, SA-12, SA-13, SC-3, SC-7, SC-11, SC-20, SC-21, SC-22, SC-23, SC-25, SC-26, SC-27, SC-29, SC-30, SC-31, SI-3, SI-8	+ 60%

Penetration Tests

80% of the successful attacks used known vulnerabilities

Paradigm Shift(s)



Balance/tune essential elements now in operation

OBSTACLE

CXOs are **accountable** for IT security

BUT

directly supervise only a small part of the systems actually in use.

LAW
and
POLICY

POLICY

Compliance "*SNAPSHOTS*"

1. "**Annual**" awareness course
2. "**Annual**" systems inventory
3. "**Annual**" testing
4. C&A¤ every "**three**" years
5. Weaknesses "**Quarterly**"
6. **Configuration Management**
7. **Incident Reporting**

¤ Certification and Accreditation studies

One Word

On December 17, 2002, the President signed into law the Electronic Government Act. Title III of that Act is FISMA, which *lays out the framework for* ?**annual**? *IT security reviews, reporting, and remediation planning at federal agencies.* It requires that agency heads and IGs evaluate their agencies' computer security programs and report the results of those evaluations to OMB, Congress, and the GAO.

[1] House Oversight and Government Reform website

C&A PROCESS

Issues

C&A Concerns

a. Once in 3 year study of 110 technical, managerial and operational controls (NIST 800-53)
   - 25-2000 pages; $30K - $+2.5M

b. Library cost: $130M in 6 years
   - 95,000 pages @ $1400 per page

c. Changes: 150 -200 a week;
   - 24,000 programs changed in 3 years

Issues

C&A Concerns

d. Technical control sections are out of date rapidly
e. C&A's focus on individual systems. Enterprise faces risk.
f. Many attacks focus on subset of controls (CAG)

Pilot

Continuous:

7. **Incident Reporting**
6. **Configuration Management**
5. “**Daily**” weakness updates
4. C&A technical controls **x 72** ¤
3. **Daily** not “**Annual**” testing
2. **Inventory** improvements
1. “**Daily**” awareness training

¤ Certification and Accreditation study of technical controls

Solutions

Targeted Gains

C&A cost down 56% then 62%

- Invest in tool kits for everything
  - Contractor support just in time

Technical control data efficiency:

- Every **2-15 days** not **3 years**

Assemble accountable tiger teams:

- inventory and to reduce site risks

Increasing Readiness

SOLUTION

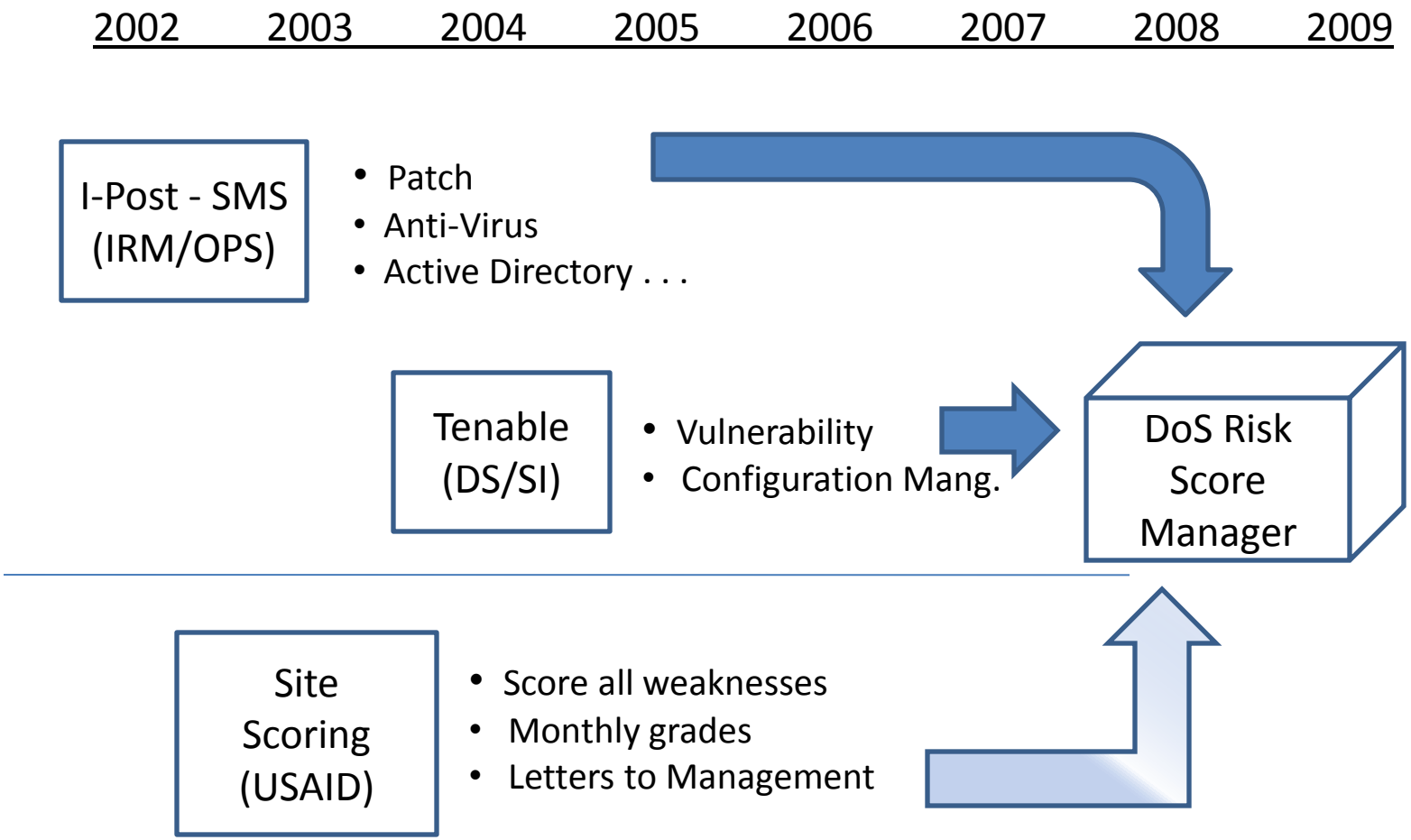
Information & Tools

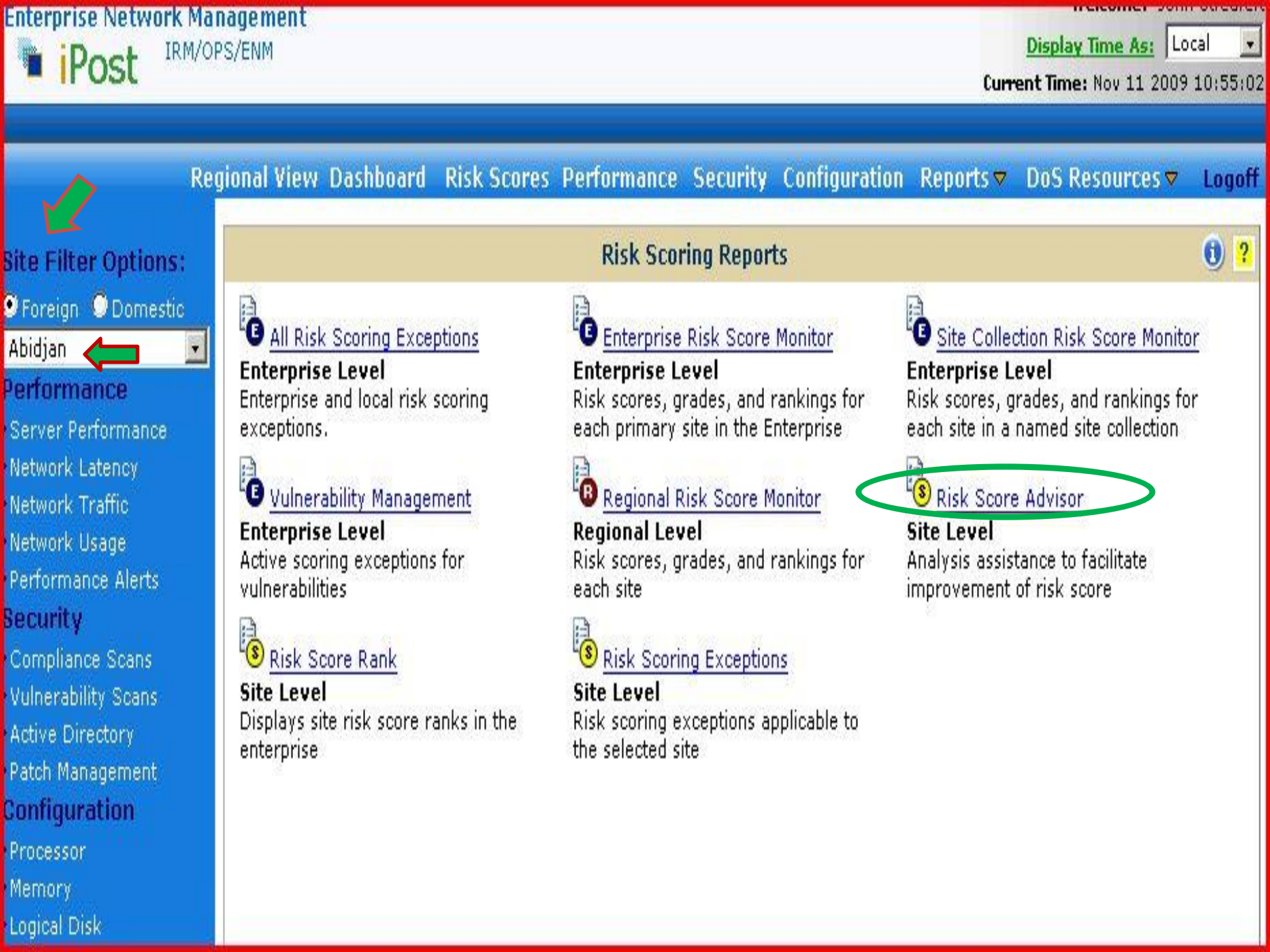
Timely – Targeted[2] – Prioritized

"Metrics with the Most Meaning"

[2] **The One to One Fieldbook: The Complete Toolkit for Implementing a 1 to 1 Marketing Program *by* Don Peppers, Martha Rogers, *and* Bob Dorf**

DoS Continuous Monitoring




Enterprise Network Management
iPost
IRM/OPS/ENM
Display Time As:
Local
Current Time: Nov 11 2009 10:55:02
Regional View
Dashboard
Risk Scores
Performance
Security
Configuration
Reports
DoS Resources
Logoff
Site Filter Options:
Foreign
Domestic
Abidjan
Performance
Server Performance
Network Latency
Network Traffic
Network Usage
Performance Alerts
Security
Compliance Scans
Vulnerability Scans
Active Directory
Patch Management
Configuration
Processor
Memory
Logical Disk
Risk Scoring Reports
All Risk Scoring Exceptions
Enterprise Level
Enterprise and local risk scoring exceptions.
Enterprise Risk Score Monitor
Enterprise Level
Risk scores, grades, and rankings for each primary site in the Enterprise
Site Collection Risk Score Monitor
Enterprise Level
Risk scores, grades, and rankings for each site in a named site collection
Vulnerability Management
Enterprise Level
Active scoring exceptions for vulnerabilities
Regional Risk Score Monitor
Regional Level
Risk scores, grades, and rankings for each site
Risk Score Advisor
Site Level
Analysis assistance to facilitate improvement of risk score
Risk Score Rank
Site Level
Displays site risk score ranks in the enterprise
Risk Scoring Exceptions
Site Level
Risk scoring exceptions applicable to the selected site

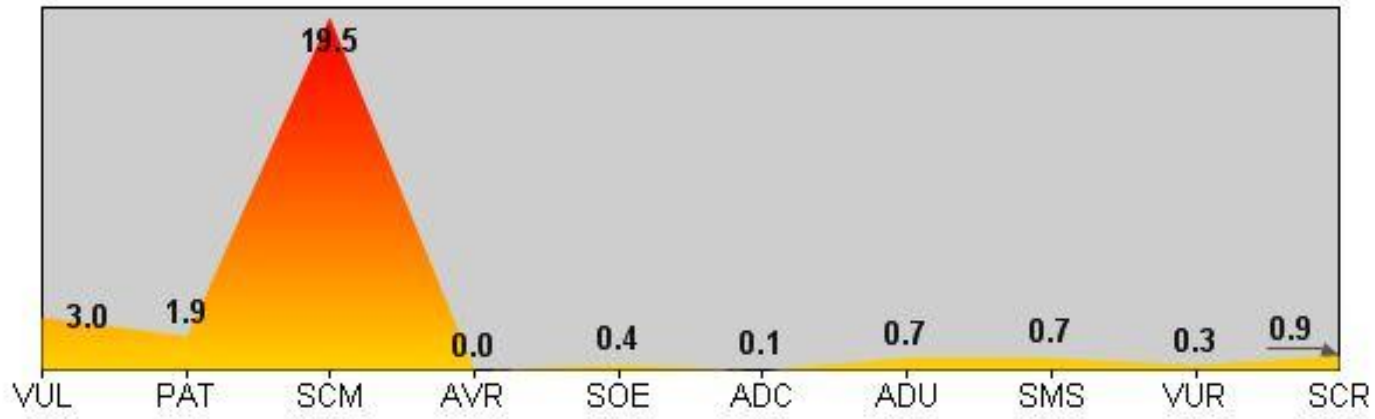
Risk Score Advisor

The following grading scale is provided by Information Assurance and may be revised periodically.

Site Risk Score	8,687.1
Hosts	317
Average Risk Score	27.4
Risk Level Grade	A+
Rank in Enterprise	163 of 438
Rank in Region	16 of 48

Average Risk Score		
At Least	Less Than	Grade
0.0	40.0	A+
40.0	75.0	A
75.0	110.0	B
110.0	180.0	C
180.0	280.0	D
280.0	400.0	F
400.0	-	F-

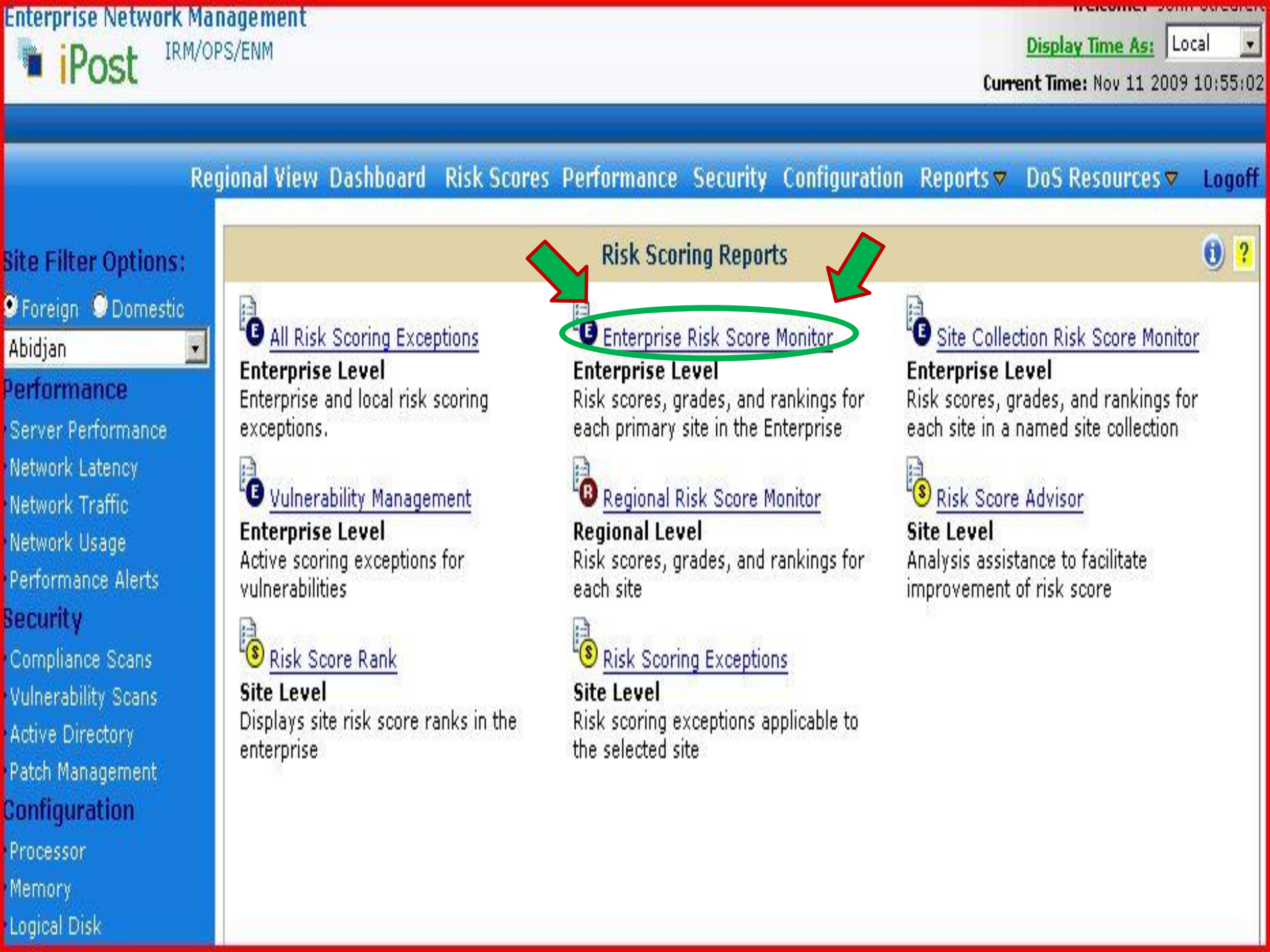
Risk Score Profile



Component	Risk Score	Avg / Host	% of Score	How Component is Calculated
VUL - Vulnerability	947.0	3.0	10.9 %	From .1 for the lowest risk vulnerability to 10 for the highest risk vulnerability
PAT - Patch	603.0	1.9	6.9 %	From 3 for each missing "Low" patch to 10 for each missing "Critical" patch
SCM - Security Compliance	6,181.2	19.5	71.2 %	From .9 for each failed Application Log check to .43 for each failed Group Membership check
AVR - Anti-Virus	0.0	0.0	0.0 %	6 per day for each signature file older than 6 days
SOE - SOE Compliance	115.0	0.4	1.3 %	5 for each missing or incorrect version of an SOE component
ADC - AD Computers	26.0	0.1	0.3 %	1 per day for each day the AD computer password age exceeds 35 days
ADU - AD Users	222.0	0.7	2.6 %	1 per day for each account that does not require a smart-card and whose password age > 60, plus 5 additional if the password never expires
SMS - SMS Reporting	230.0	0.7	2.6 %	100 + 10 per day for each host not reporting completely to SMS
VUR - Vulnerability Reporting	84.0	0.3	1.0 %	After a host has no scans for 15 consecutive days, 5 + 1 per 7 additional days
SCR - Security Compliance Reporting	279.0	0.9	3.2 %	After a host has no scans for 30 consecutive days, 5 + 1 per 15 additional days
Total Risk Score	**8,687.1**	**27.4**	**100.0 %**	

For additional information on Risk Scoring, assistance with remediations, or to report suspected false positives, contact the IT Service Center to open a "Risk Score" ticket.


Top 10 Host Risk Scores
Y1385
AIS01
AFP03
1374
1897
1109
1587
1393
1901
1667
0
50
100
150
200
250
300
Risk Score History
2009
May 01 2009
Jun 01 2009
Jul 01 2009
Aug 01 2009
Sep 01 2009
Oct 01 2009
Nov 01 2009


Enterprise Network Management
iPost
IRM/OPS/ENM
Display Time As: Local
Current Time: Nov 11 2009 10:55:02
Regional View Dashboard Risk Scores Performance Security Configuration Reports DoS Resources Logoff
Site Filter Options:
Foreign Domestic
Abidjan
Performance
Server Performance
Network Latency
Network Traffic
Network Usage
Performance Alerts
Security
Compliance Scans
Vulnerability Scans
Active Directory
Patch Management
Configuration
Processor
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Risk Score Monitor Enterprise

Total Hosts	32,366	51,157
Average Risk Score per Host	101.7	33.2

Grading Scale

Average Risk Score		
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0.0	40.0	A+
40.0	75.0	A
75.0	110.0	B
110.0	180.0	C
180.0	280.0	D
280.0	400.0	F
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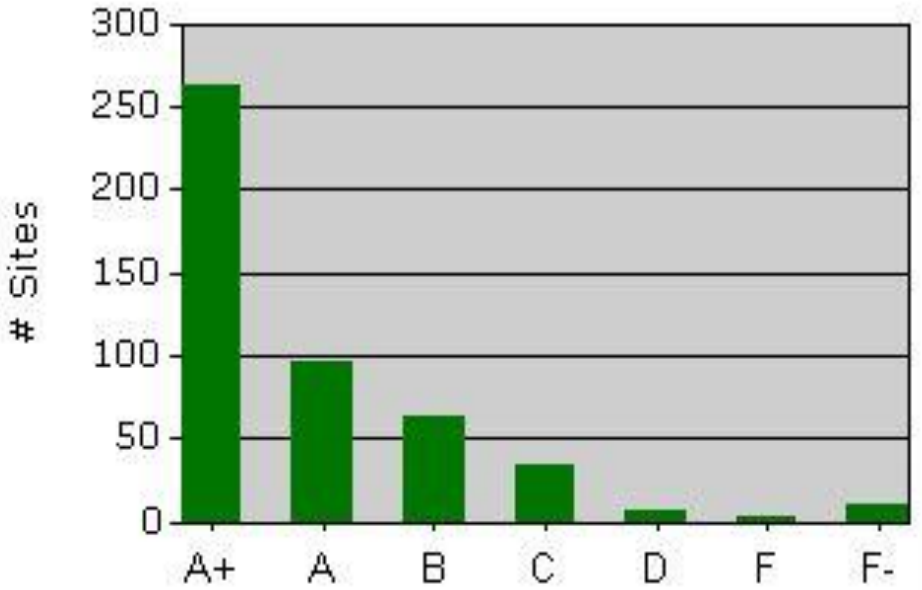
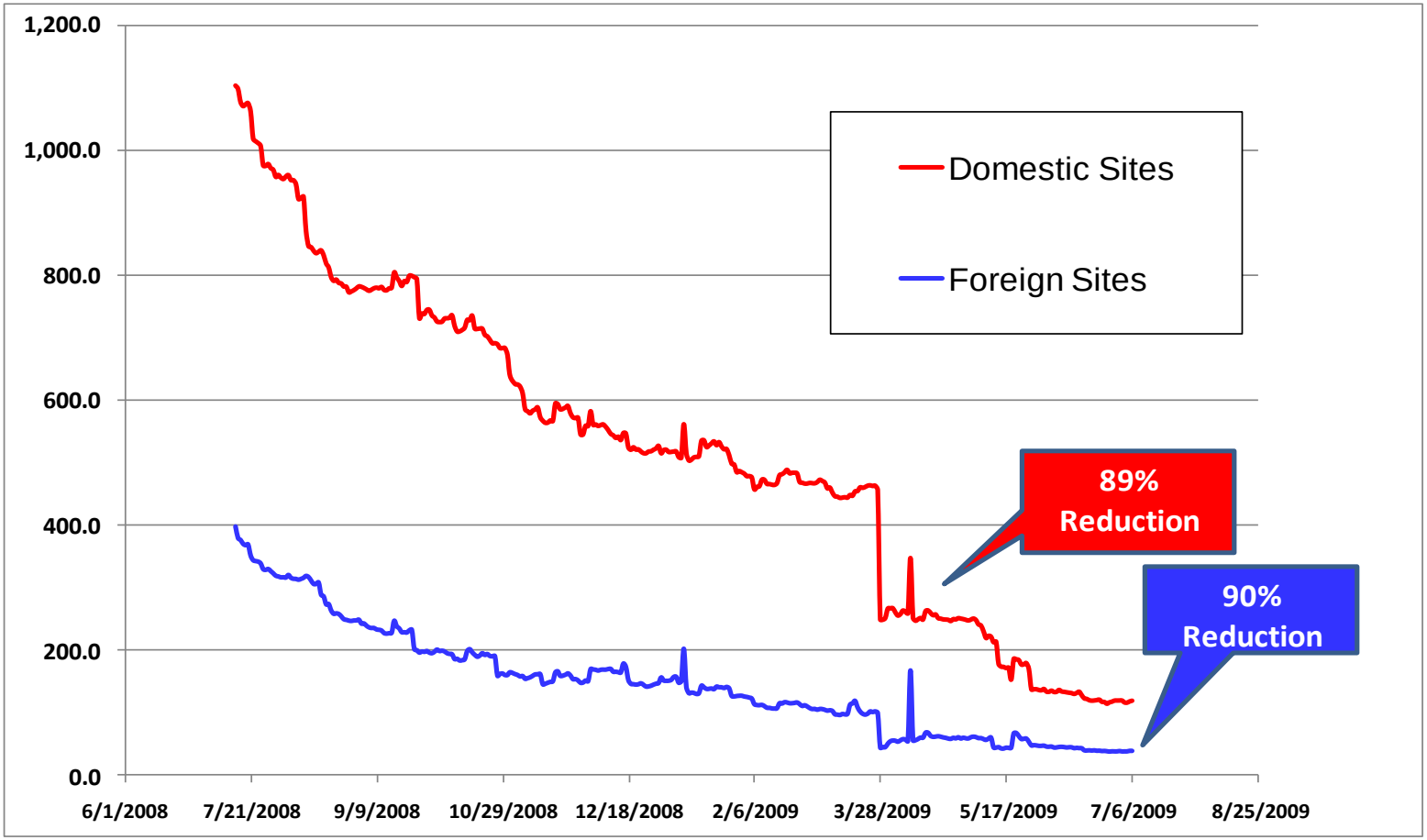
Grade Dis



Results in 12 Months



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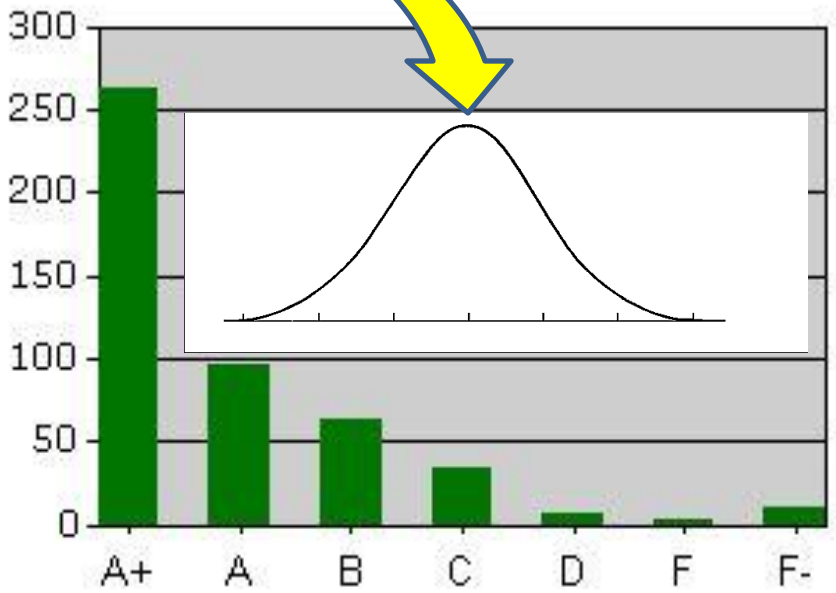
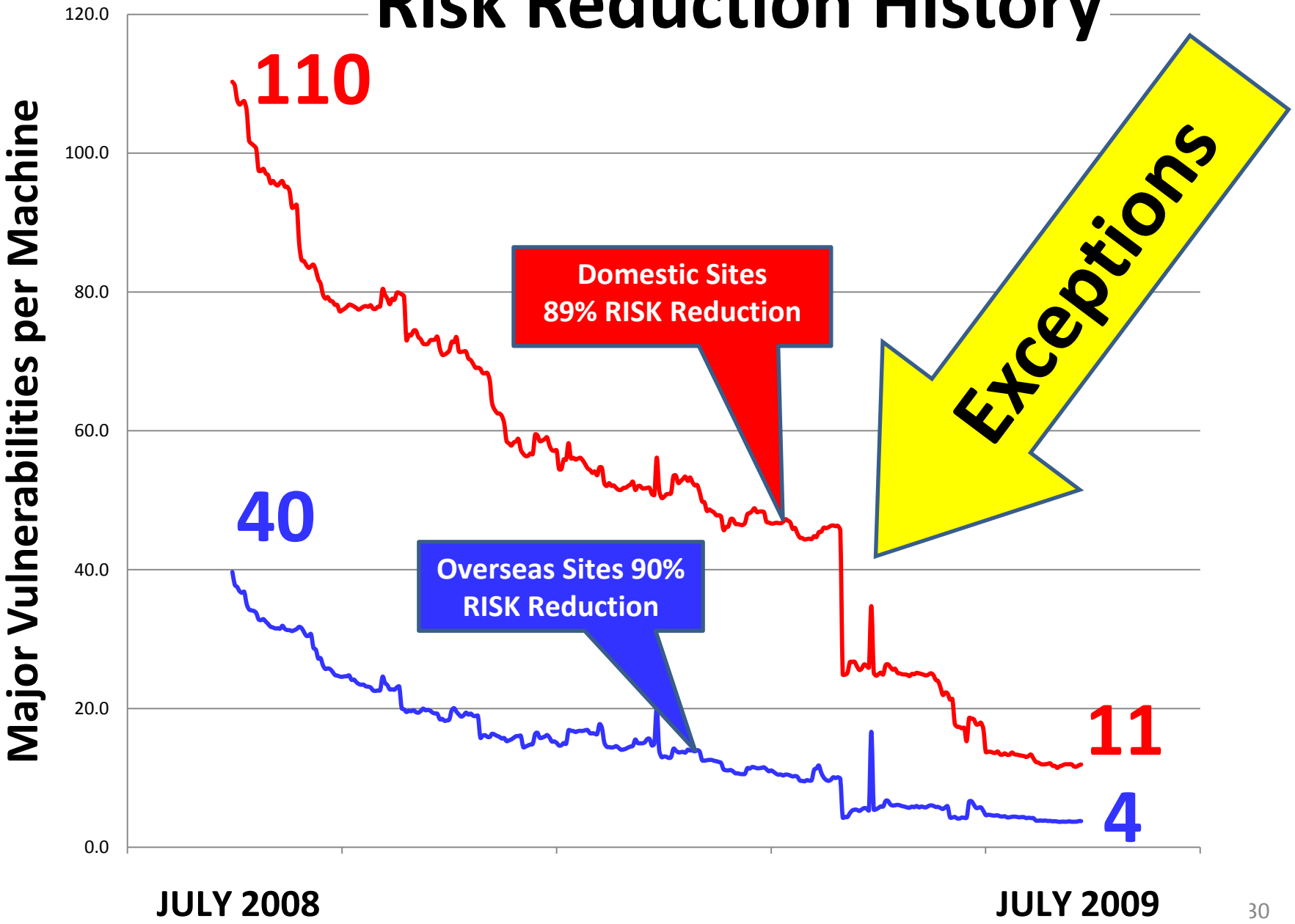
40.0	75.0	A	25
75.0	110.0	B	36
110.0	180.0	C	60
180.0	280.0	D	93
280.0	400.0	F	133
400.0	-	F-	

Grade Dis



Risk Reduction History



Deploying Assets To Win

Finding

Details empower technical managers

FOR TARGETED, DAILY ATTENTION TO REMEDIATION

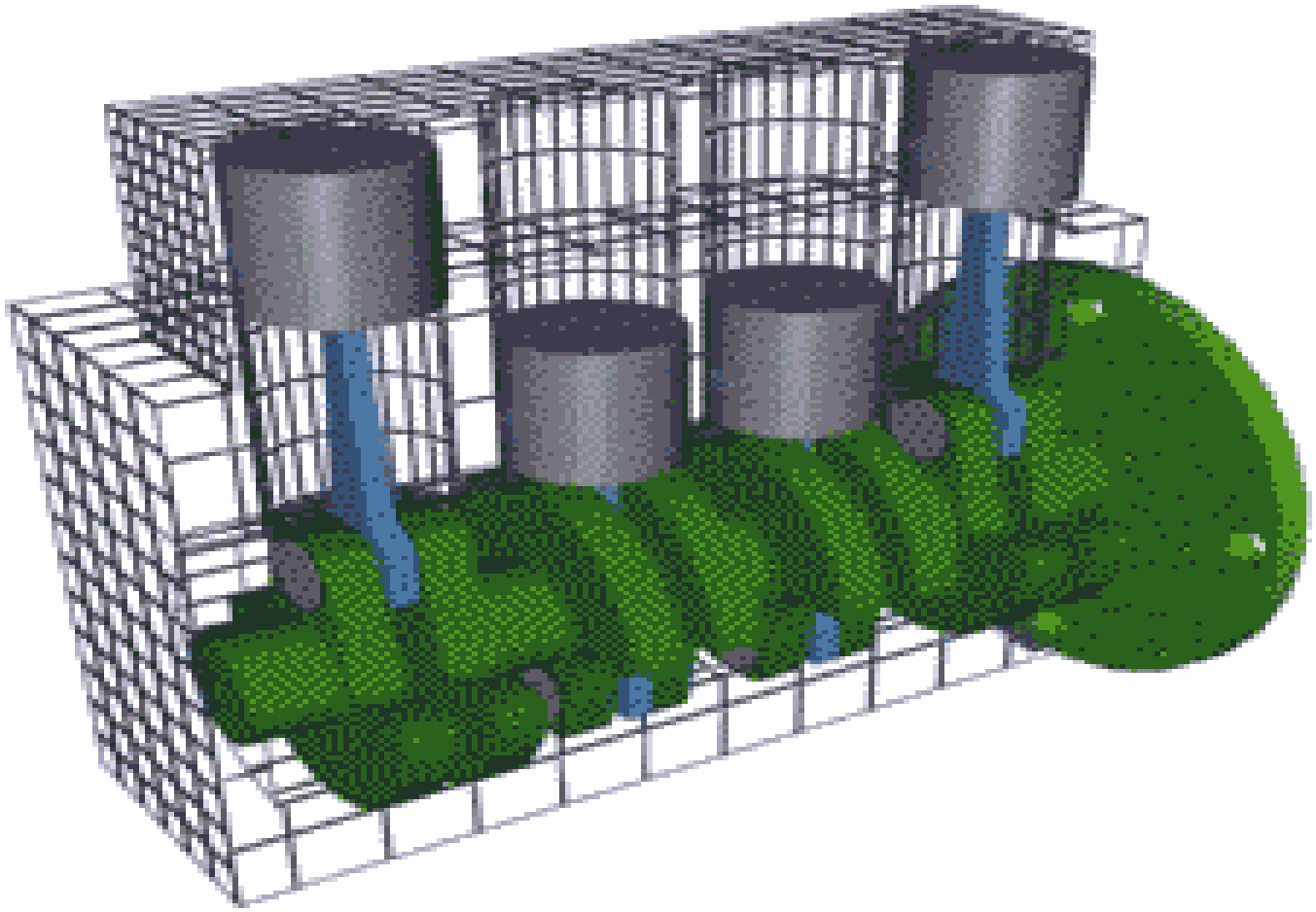
Summaries empower executives

TO OVERSEE CORRECTION OF MOST SERIOUS PROBLEMS

Lessons Learned

- When **continuous monitoring** augments snapshots required by FISMA:
  - Mobilizing to lower risk is feasible & fast (11 mo)
  - Changes in 24 time zones with no direct contact
  - Cost: 15 FTE above technical management base
- This approach leverages the wider workforce
- Security culture gains are grounded in fairness, commitment and personal accountability for improvement

Implementation



Cylinder # 1: Change

- Business/Organization critical success factors:
  - Business Change Management
  - Communications
  - Culture of Cost Effectiveness
  - Negotiation
  - Security Risk/Threat Analysis
  - Performance Measurement
  - Data Analysis

Cylinder #2: Technical

- Critical Success Factors (Technical):
  - Data Enclave Protection
  - ID & Authentication
  - Data Mining Tools: Interface Design and Construction
  - Database design/administration/hardening
  - Information Broker management
  - System Administration

Cylinder #3: Adequacy of Plan

Coverage of CAG

View

Cylinder #4: Logistics

Tools to Deploy:

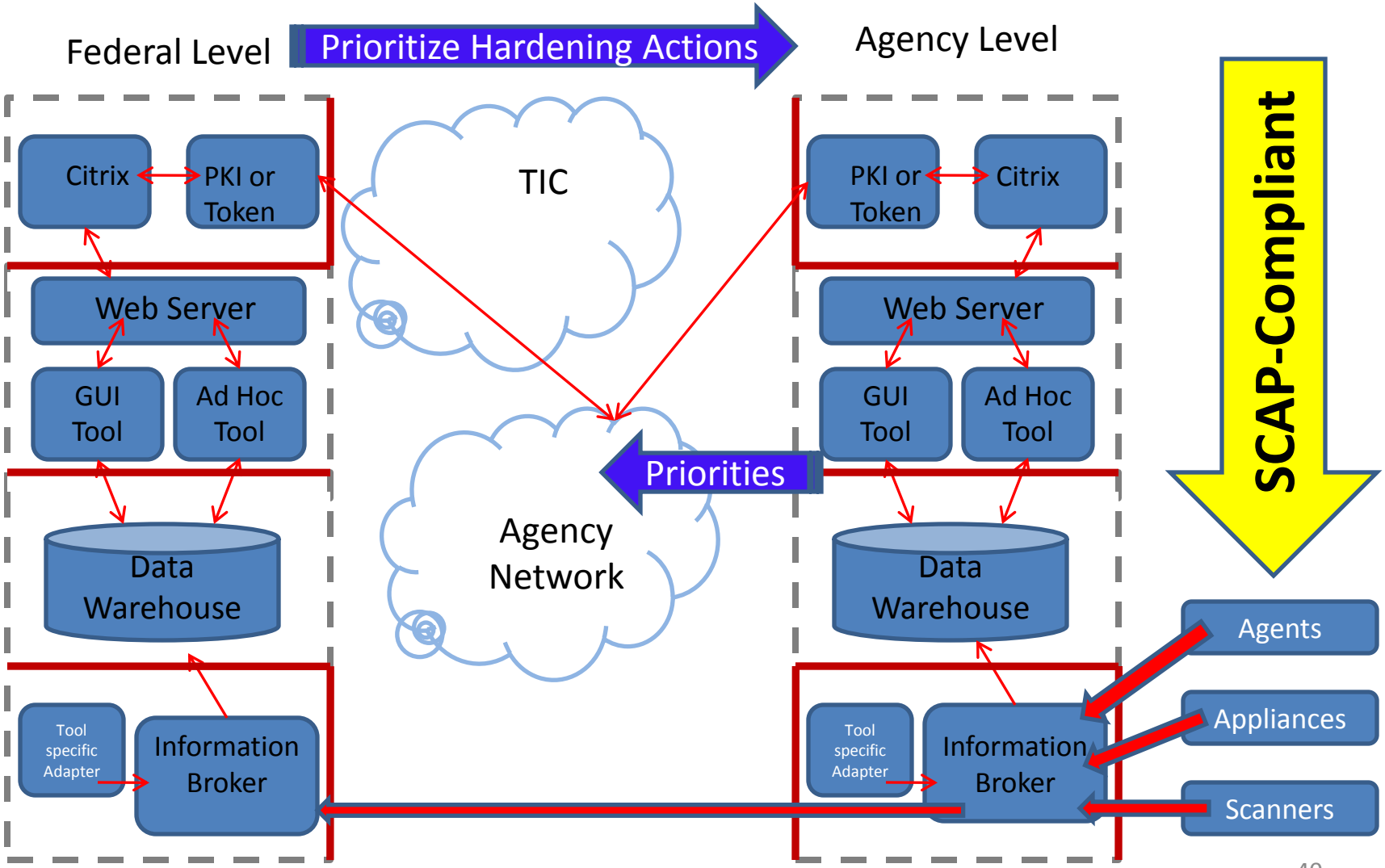
1. CAG Directed Toolset – baseline growing to 15 control families. Status now:
   a. SMS (Systems Management Server – Microsoft)
   b. Vulnerability/Configuration Management
      - N-Circle, Tenable, McAfee
2. Data warehouse to store enterprise risk information securely (GOTS)
3. Risk Scoring Dashboard (GOTS)

Cylinder #5: Acquisition

Model:

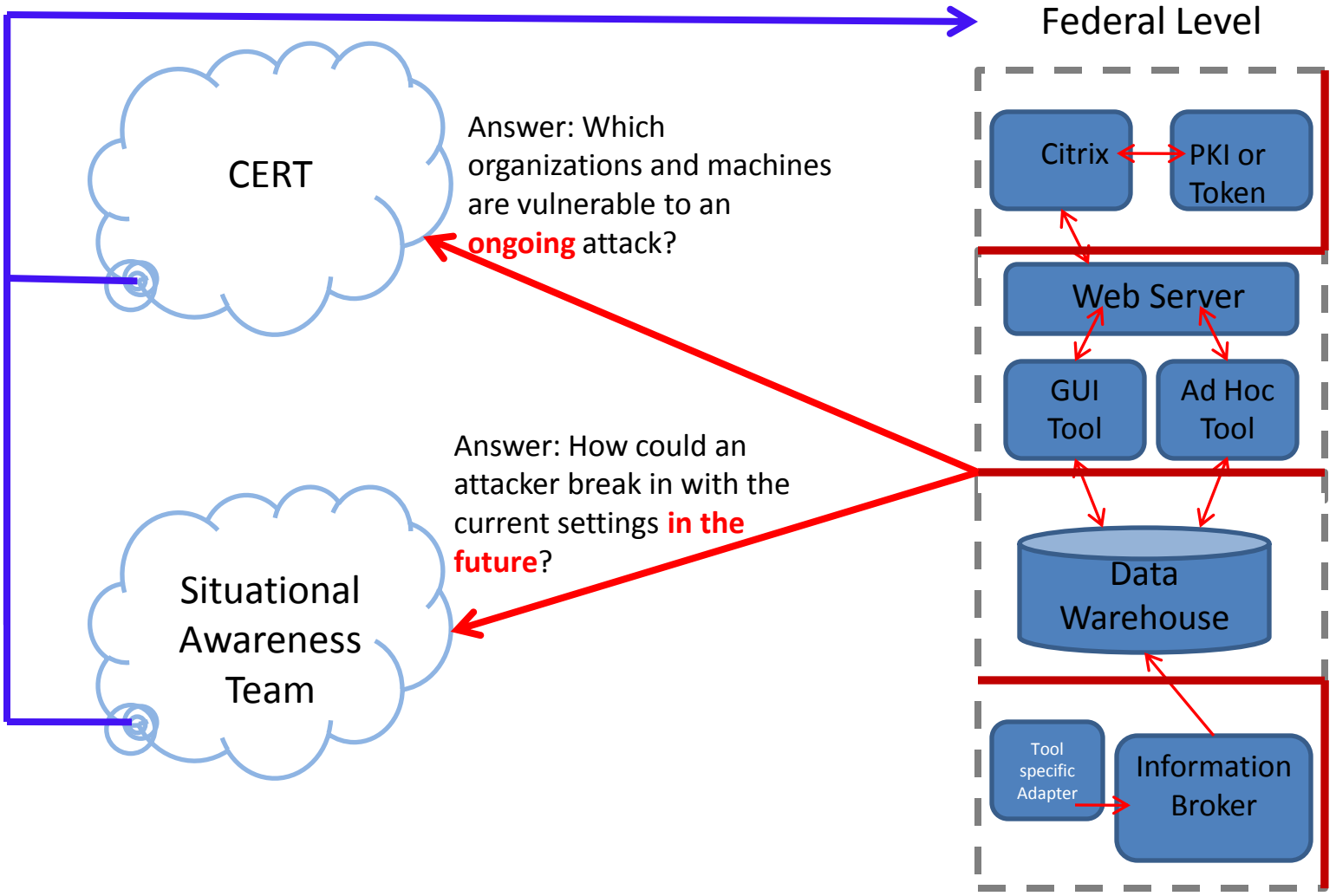
- Multiple award contract from GSA
  - Dashboard, 15 tool groups, data integration
  - Continuous update of scanner technology
- OMB, DHS, NIST guidance to protect .gov
  - Yardsticks needed for each of 20 CAG elements
  - Public-private FDCC model achieved the most, the fastest;
- Federal level interdisciplinary support team

Cylinder #6: Architecture



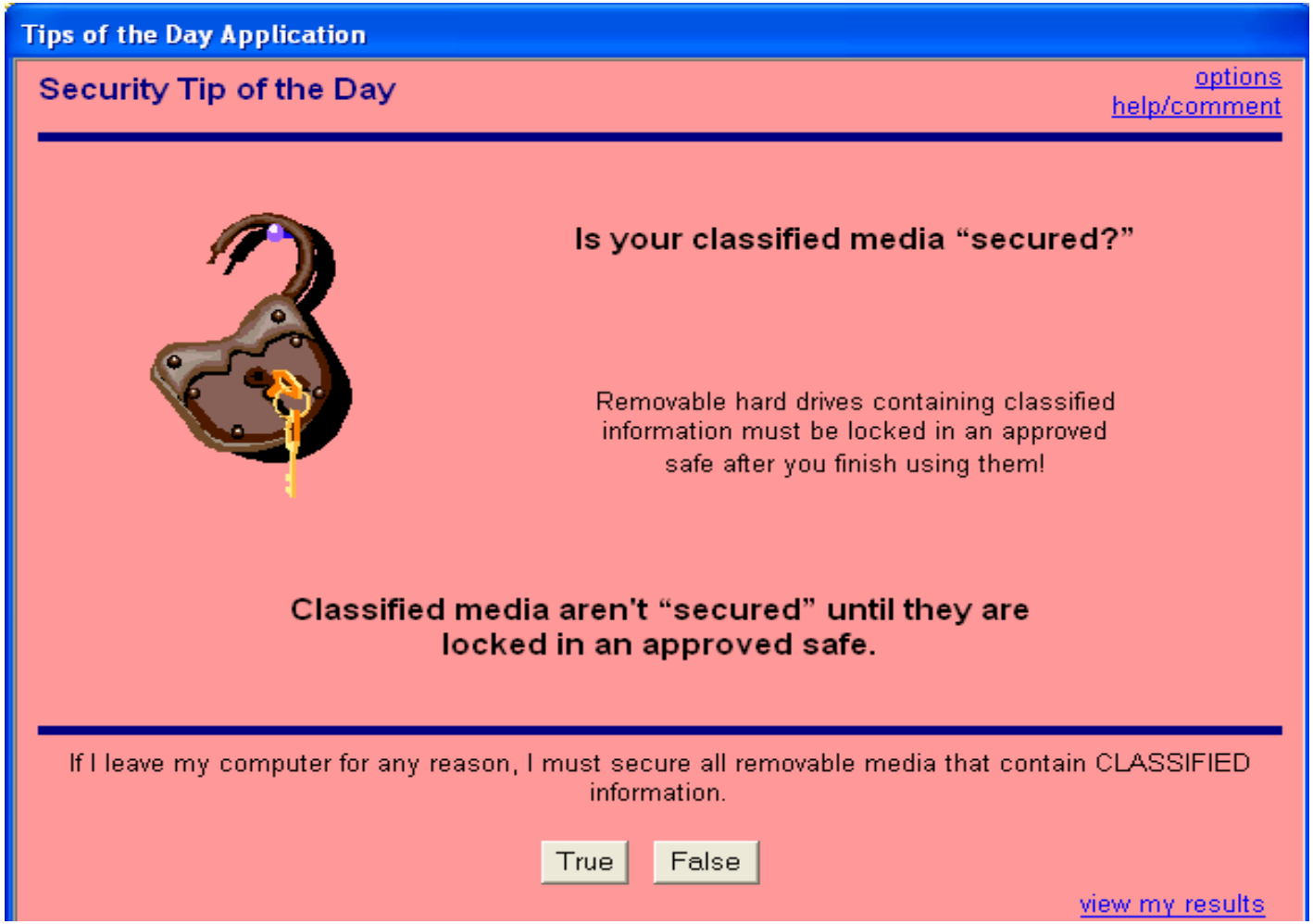
Cylinder #7: Integration

Answer: Adjust priorities for hardening in response to actual/possible threats



SOLUTION

Cylinder #8 Training



Federal conclusions

- **Scalable to large complex public and private sector organizations**
- **Higher ROI for continuous monitoring of technical controls as a substitute for paper reports**
- Summarized risk estimates could be fed to Cyber Scope in lieu of outdated compliance results